

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 2, 3, 5, 6, 8, 9, and 11-44 are pending. Claims 1, 4, 7, and 10 are canceled without prejudice or disclaimer. Claims 2, 3, 5, 6, 8, 9, 11-13, 15, 17, 19, 21, 23, 25-27, and 29-40 are amended. Claims 41-44 are newly added. Support for the amendments to Claims 2, 3, 5, 6, 8, 9, 11, and 12 is self-evident. Support for the amendments to Claims 12, 15, 17, 19, 33, and 34-36 can be found at page 19, line 1- page 20, line 15, for example. Support for the amendments to Claims 21, 23, 25-27, 29-32 and 37-40 can be found at page 11, line 15 – page 12, line 5, for example. Support for newly added Claims 41-44 can be found in now-canceled Claims 1, 4, 7, 10, respectively and at page 11, line 15 – page 12, line 5 and at page 15, lines 20-23 for example. No new matter is added.

In the outstanding Office Action, Claims 1, 4, 29, and 30 were rejected under 35 U.S.C. § 102(b) as anticipated by Japanese Patent Pub. 2000-155516 to Hisayoshi herein “JP '516”. Claims 21-24, 37, and 38 were rejected under 35 U.S.C. § 102(b) as anticipated by Castelli et al. (U.S. Patent No. 5,313,252, herein “Castelli”). Claims 13-16 and 33-34 were rejected under 35 U.S.C. § 103(a) as obvious over Castelli in view of Kobayashi (Japanese Patent No. 10-186,786, herein “Kobayashi”). Claims 2, 3, 5, and 6 were rejected under 35 U.S.C. § 103(a) as obvious over JP '516 in view of Castelli. Claims 7, 10, 31, and 32 were rejected under 35 U.S.C. § 103(a) as obvious over JP '516 in view of Fujimori et al. (U.S. Patent No. 6,160,569, herein “Fujimori”). Claims 8, 9, 11 and 12 were rejected under 35 U.S.C. § 103(a) as obvious over JP '516 in view of Fujimori and further in view of Castelli. Claims 17-20, 35, and 36 were rejected under 35 U.S.C. § 103(a) as obvious over Castelli in view of Kobayashi and further in view of Fujimori. Claims 25-28, 39, and 40 were rejected under 35 U.S.C. § 103(a) as obvious over Castelli in view of Fujimori.

Regarding the rejection of Claims 1, 4, 29, and 30 as anticipated by JP '516, that rejection is respectfully traversed by the present response.

As Claims 1, 4, 29, and 30 are canceled without prejudice or disclaimer, Applicant respectfully submits that the rejection of Claims 1, 4, 29, and 30 is moot. As Claims 41 recites the features of Claims 1, Applicant addresses the rejection of Claim 1 in relation to newly added Claim 41. Newly added Claim 41 recites:

An electrophotographic image forming apparatus comprising:
a drum speed controller; and
an image forming section including,
an image carrier configured to carry a toner image and a lattice having equal intervals,
an endless belt, and
an image transferring means configured to transfer the toner image from said image carrier to a recording medium conveyed by the endless belt and electrostatically adhered to said belt, said image transfer means further configured to transfer the lattice pattern to the belt,
wherein a surface of said image carrier and a surface of said belt are configured to move at a speed of Vd and a speed of Vb, respectively, and the drum speed controller is configured to control a ratio Vd/Vb based on a relation $(Vb/Vd) = (\text{belt lattice interval}/\text{drum lattice interval})$, and
the ratio of Vb/Vd is variable by a user of said image forming apparatus.

Accordingly, a drum speed controller controls a ratio Vd/Vb based on a relation:

$$(Vb/Vd) = (\text{belt lattice interval}/\text{drum lattice interval}).$$

In contrast, JP '516 does not describe any specific relationship through which the surface velocity of the belt surface and drum surface may be calculated. Additionally, JP '516 does not describe a belt lattice interval or a drum lattice interval as recited in newly added Claim 41. Accordingly, Applicant respectfully submits that newly added Claim 41 patentably distinguishes over JP '516 for at least the reasons discussed above.

Moreover, the remaining references, Castelli, Kobayashi, and Fujimori each fail to disclose a drum speed controller that controls a ratio of the belt speed to the drum speed based on a relation of a belt lattice interval divided by drum lattice interval as recited in newly added Claim 41.

Castelli describes a method for controlling speed match between a photoreceptor and an intermediate transfer member to prevent image degradation.¹ The method includes varying the velocity of the photoreceptor member over a range of speeds while monitoring the electrical current demanded by the photoreceptor drive motor. When the photoreceptor and intermediate transfer member have different average speeds, the amount of current demanded by the drive motor remains roughly constant because drag on the photoreceptor remains constant. When the photoreceptor and intermediate transfer member have the same average speed, the intermediate transfer member and photoreceptor will still slightly move back and forth relative to each other. Thus, the current demanded by the drive motor will oscillate.² A controller is then used to maintain the motor velocity at a speed slightly less than or slightly greater than the intermediate transfer member speed to avoid the back and forth motion between the photoreceptor and intermediate transfer member.³ Nowhere in Castelli is a lattice on either the photoreceptor or intermediate transfer member used to control a ratio of speeds between the two components. Accordingly, Castelli suffers from the same deficiencies as JP '516.

Kobayashi, in its English abstract describes setting the circumferential speed of an intermediate transfer belt (9) such that the speed is less than a circumferential speed of a recording medium (V_{paper}) and greater than a circumferential speed of a photosensitive drum (V_{drum}). However, Kobayashi does not disclose a drum speed controller that controls a ratio of the drum speed and belt speed based on the specific relation of lattice patterns recited in newly added independent Claim 41.

Fujimori describes controlling the speed of an image transfer belt (16) with register marks located at predetermined positions on the inside of the intermediate image transfer belt (16).

¹ Castelli Abstract.

² Id.

³ Id.

Fujimori states:

Further, the intermediate image transfer belt 16 has register marks 30x and 30y at predetermined interior positions thereof. The register mark 30x is used for a determination of a timing for transferring each color toner image from the photoconductor 10 onto the intermediate image transfer belt 16. The register mark 30y is used for a determination of a timing for transferring the full-color image from the intermediate image transfer belt 16 onto the recording sheet 25 sent by the registration roller 27. These register marks 30x and 30y are detected by a mark sensor 31 which is disposed at a predetermined position inside the intermediate image transfer belt 16. After the sheet transfer operation is completed, the recording sheet 25 is further advanced to a fixing unit 33 (FIG. 4) by a sheet transfer belt 32.⁴

Accordingly, Fujimori uses preexisting register marks and does not disclose a drum speed controller that controls a ratio of the drum speed and belt speed based on the specific relation of lattice patterns recited in newly added independent Claim 41.

Newly added Claims 42-44 recite substantially similar features to those discussed above regarding newly added Claim 41. Accordingly, Applicant respectfully submits that newly added Claims 42-44 patentably distinguish over the cited references, taken alone or in any reasonable combination, for at least the same reasons as newly added Claim 41.

Applicant further respectfully submits that amended independent Claims 21, 23, 25, 27, 29, 30, 32, 37, and 38-40 recite substantially similar features to those discussed above regarding newly added independent Claim 41. Accordingly, Claims 21, 23, 25, 27, 29, 30, 32, 37, and 38-40 patentably distinguish over the cited references for at least the same reasons as newly added independent Claim 41.

Each of Claims 2, 3, 5, 6, 8, 9, 11, 12, 22, 24, 26, and 28 depends from one of amended independent Claims 21, 23, 25, 27, 29, 30, 32, 37, and 38-40. Accordingly, Applicant respectfully submits that dependent Claims 2, 3, 5, 6, 8, 9, 11, 12, 22, 24, 26, and 28 are allowable for at least the same reasons as the claims from which they depend.

⁴ Fujimori, col. 9, lines 16-30.

Regarding the rejection of Claims 13-16 and 33-34 as obvious over Castelli in view of Kobayashi, that rejection is respectfully traversed by the present response.

Amended Claim 13 recites the feature of an intermediate image transferring means with a surface that moves at a speed V_i . Additionally, Claim 13 recites a recording medium that moves at a speed V_p . Further a ratio of V_p/V_i is variable from a value greater than 1 to a value below 1. The variation is implemented by a user of said image forming apparatus via a user input configured to set the ratio during operation of the electrophotographic color image forming apparatus.

The outstanding Office Action acknowledges that Castelli fails to disclose a variability in the speed ratio between the intermediate transfer belt and the recording medium and relies on Kobayashi for this feature.⁵

However, Kobayashi merely describes "setting" a ratio of a drum velocity V_{drum} and a velocity of a paper V_{paper} . To the extent that Kobayashi describes what mechanism "sets" this velocity, Kobayashi states that it is based on a signal from an environmental sensor (22) which detects temperature and humidity of the equipment and changes the speed of the imprint belt (9) according to the signal. In other words, the ratio is set internally without external input. Nowhere does Kobayashi describe a user input configured to set the ratio at a value in a range from greater than 1 to less than 1 during operation of the electrophotographic color image forming apparatus as recited in amended independent Claim 13. Thus, no reasonable combination of Castelli with Kobayashi includes all of the limitation of amended independent Claim 13. Accordingly, Applicant respectfully submits that the rejection of amended independent Claim 13 is overcome for at least the reasons discussed above.

None of the remaining cited references remedies the deficiencies of Castelli and Kobayashi discussed above.

⁵ Outstanding Office Action at 4.

JP '516 describes setting a velocity of an image forming body (Vp) and intermediate transfer body (Vb).⁶ However, JP '516 does not disclose controlling a ratio of **recording medium speed/intermediate transferring means speed** (Vp/Vi) via a user input configured to set the ratio in the range of values recited in amended Claim 13. Indeed, JP '516 fails to disclose varying the speed of a recording medium relative to the speed of the intermediate transfer body (Vb) at all, much less as recited in amended Claim 13.

Fujimori describes a system with a controller that controls a speed (A) of a laser beam relative to a photoconductor (10), i.e., "process line speed A."⁷ Fujimori further describes controlling the speed (B) at which intermediate image transfer belt (16) transfers an image to a recording sheet (25), i.e., process line speed B.⁸ However, Fujimori does not disclose varying a speed of a recording medium relative to the speed of the intermediate image transfer belt (16). Therefore, Fujimori does not disclose controlling a ratio of recording medium speed/intermediate transferring means speed (Vp/Vi) via a user input as recited in amended Claim 13. Accordingly, Fujimori fails to remedy the deficiencies of Castelli, Kobayashi, and JP '516 discussed above.

Amended independent Claims 15, 17, 19, and 34-36 recite substantially similar features to amended independent Claim 13, and Applicant respectfully submits that Claims 15, 17, 19, and 34-36 patentably distinguish over the cited references for at least the same reasons as amended independent Claim 13.

Claims 16, 18, and 20 depend from amended Claims 15, 17, and 19, respectively. Accordingly, Applicant respectfully submits that Claims 16, 18, and 20 are allowable for at least the same reasons as the claims from which they depend.

⁶ '516, English Abstract. Note that "Vp" in '516 refers to the velocity of the image forming body and not the velocity of the paper.

⁷ Fujimori, col. 10, lines 22-24.

⁸ Fujimori, col. 10, lines 39-41.

Consequently, in light of the above discussion and in view of the present amendments, the present application is believed to be in condition for allowance, and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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